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US EPA

Cooperative Research and Development Agreement With Haskell Laboratory of E.I. Du Pont de Nemours & Company

Visual Function Studies During Exposure to a Mixture of Dibasic Esters (DBE) in Long-Evans Rats

Participants

This Cooperative Research and Development Agreement (CRADA) brings together Haskell Laboratory of E.I. Du Pont de Nemours & Company and the U.S. Environmental Protection Agency's (EPA) Health Effects Research Laboratory (HERL) in Research Triangle Park, North Carolina.

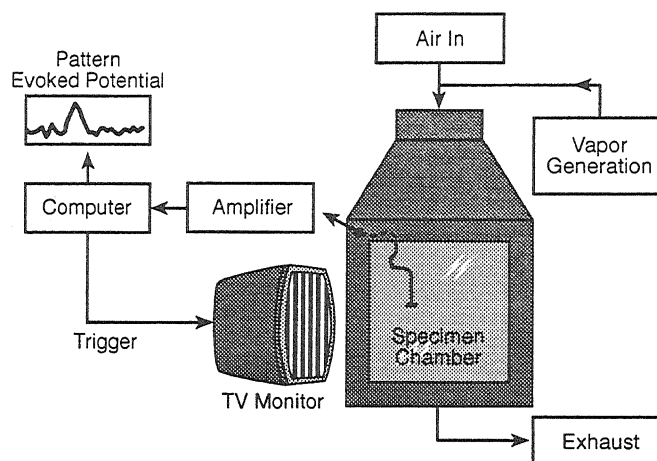
Purpose

The purpose of this agreement is for Haskell Laboratory of E. I. Du Pont de Nemours & Company and HERL to examine the effects of exposure to aliphatic dibasic acid esters on visual evoked potentials (VEPs) using EPA's animal model of human spatial vision, and to train Du Pont personnel to enable them to conduct studies using the model. VEPs are electrical signals emitted by cortical neurons responding to a visual stimulus, and can be recorded from humans or animals.

This agreement will allow EPA to establish the capacity for recording VEPs during inhalation exposure, and will add to the data base on visually active compounds. This CRADA will also allow Du Pont to obtain data on the potential for the mixture of DBE to alter pattern vision, and provide an opportunity for Du Pont personnel to gain familiarity and experience with electrophysiological measures of visual function.

HERL conducts research to support the programmatic needs of EPA for development and validation of testing methodology that might be invoked for product safety testing under the Federal Insecticide and Rodenticide Act. Another purpose of EPA is for toxicity data via the inhalation route to establish inhalation reference concentrations under the Clean Air Act.

HERL has received reports from industrial customers that there are abnormalities of visual perception while working during solvent applications. Du Pont has



Procedure for recording visual evoked potentials during inhalation exposure.

conducted onsite monitoring of exposure levels and found that some applications of a DBE mixture led to exposure levels in excess of the recommended maximum. It was decided by Du Pont that an animal model of human spatial vision was needed to address the problem. A CRADA with HERL was established to investigate the potential for DBE vapor to effect visual system function.

Results

A unique inhalation chamber was constructed to allow simultaneous inhalation exposure and VEP measures. Also the hypothesis that systemic exposure to the DBE mixture alters spatial vision was investigated using intraperitoneal, gavage and nasal (drops) administrations. VEP measures of visual function and the recording of VEPs did not differ significantly between control and exposed groups. VEPs are successfully being recorded during inhalation exposure to the DBE mixture, clean air and positive control substances. The concentration-duration gradient must be extended to produce a higher internal dose, however before DBE effects on visual function can be fully assessed.



This is one of more than 50 cooperative research and development agreements EPA has with various U.S. businesses, consortiums, trade associations, academic institutions and state and local governments under the Federal Technology Transfer Act of 1986. These agreements serve as a mechanism for EPA to work with the private sector to develop new pollution prevention and control technologies and efficiently bring them into the marketplace

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